Name: _____ Per: ____

Determining Measures Using Similarity

The same ideas you used to determine the parts of congruent triangles apply to similar triangles. The statement tells you which **angles are congruent**, and which **sides are similar**. Example: $\triangle RST \sim \triangle MNP$

Angles are easy…they're just congruent.

$\triangle RST \sim \triangle MNP$
$\angle R \cong \angle M$
$\angle S \cong \angle N$
$\angle T \cong \angle P$

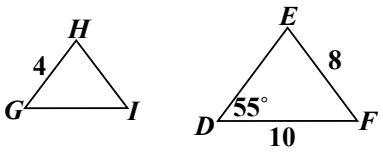
*Sides are **similar**, which means we have to set up fractions.*
*We have to go by the written order, because we don't know **small, medium,** and **large**.*
First triangle in the statement always goes on the top!

$\triangle RST \sim \triangle MNP$

RS is similar to MN	*ST is similar to NP*	*RT is similar to MP*
$\frac{RS}{MN}$	$\frac{ST}{NP}$	$\frac{RT}{MP}$

Remember, if the sides are similar, then the fractions are equal.
They also equal the **scale** fraction, which is sometimes called the "**similarity ratio**."

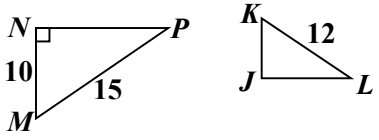
EXAMPLE
$\triangle DEF \sim \triangle IHG$. $IG = ?$ $m\angle I = ?$



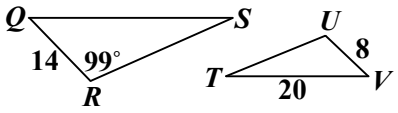
D is I, E is H, and F is G.
So, $m\angle I = m\angle D = \boxed{55°}$
Based on the *written order*, my fractions are:

$$\frac{DE}{IH} \text{ and } \frac{EF}{HG} \text{ and } \frac{DF}{IG}$$
$$\frac{DE}{IH} \text{ and } \frac{8}{4} \text{ and } \frac{10}{IG}$$
$$\frac{8}{4} = \frac{10}{IG}$$
$$8(IG) = 10(4)$$
$$8(IG) = 40$$
$$IG = \boxed{5}$$

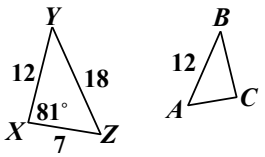
1. $\triangle JKL \sim \triangle NMP$. $JK = ?$ $m\angle J = ?$



2. $\triangle QRS \sim \triangle VUT$. $QS = ?$ $m\angle U = ?$



EXAMPLE
$\triangle ABC \sim \triangle ZYX$. $BC = ?$ $m\angle C = ?$



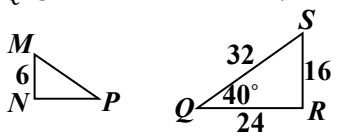
A is Z, B is Y, and C is X.
So, $m\angle C = m\angle X = \boxed{81°}$
The fractions are:

$$\frac{AB}{ZY} \text{ and } \frac{BC}{YX} \text{ and } \frac{AC}{ZX}$$
$$\frac{12}{18} \text{ and } \frac{BC}{12} \text{ and } \frac{AC}{7}$$

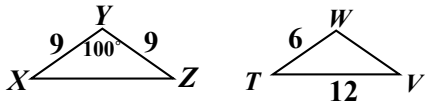
I'm looking for BC, so that's what I use.

$$\frac{12}{18} = \frac{BC}{12} \rightarrow reduce \rightarrow \frac{2}{3} = \frac{BC}{12}$$
$$2(12) = BC(3)$$
$$24 = BC(3)$$
$$8 = BC \rightarrow Sym.Prop \rightarrow BC = \boxed{8}$$

3. $\triangle QRS \sim \triangle PNM$. $PN = ?$ $m\angle P = ?$



4. $\triangle TWV \sim \triangle ZYX$. $XZ = ?$ $m\angle W = ?$



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EXAMPLE

$\triangle MNP \sim \triangle RQP$. $MN = 3$, $NP = 6$, and $QP = 8$. RQ =?

M is R, N is Q, and P is P.

The fractions are:

$$\frac{MN}{RQ} \text{ and } \frac{NP}{QP} \text{ and } \frac{MP}{RP}$$

$$\frac{3}{RQ} \text{ and } \frac{6}{8} \text{ and } \frac{MP}{RP}$$

$$\frac{3}{RQ} = \frac{6}{8} \rightarrow reduce \rightarrow \frac{3}{RQ} = \frac{3}{4}$$

$$3(4) = 3(RQ)$$

$$12 = 3(RQ)$$

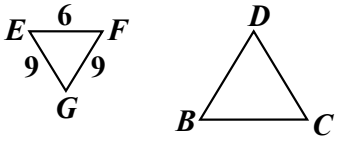
$$4 = RQ \rightarrow Sym.Prop \rightarrow RQ = \boxed{4}$$

5. $\triangle ABC \sim \triangle FGH$. $GH = 18$, $AB = 4$, and $BC = 12$. FH =?

6. $\triangle RAT \sim \triangle BAN$. $RT = 10$, $RA = 15$, and $BN = 6$. BA =?

EXAMPLE

$\triangle BCD \sim \triangle EFG$. If the similarity ratio (or scale) is $\frac{4}{3}$, what is CD?



The fractions are:

SCALE	$\frac{BC}{EF}$	$\frac{CD}{FG}$	$\frac{BD}{EG}$
$\frac{4}{3}$	$\frac{BC}{6}$	$\frac{CD}{9}$	$\frac{BD}{9}$

Since I want CD, I'll use that fraction.

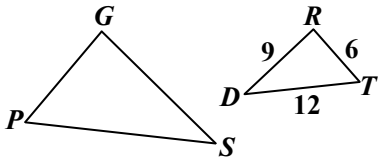
$$\frac{4}{3} = \frac{CD}{9}$$

$$4(9) = CD(3)$$

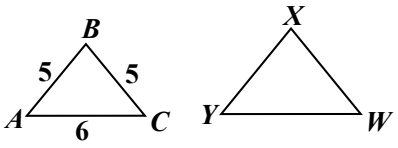
$$36 = CD(3)$$

$$12 = CD \rightarrow Sym.Prop. \rightarrow CD = \boxed{12}$$

7. $\triangle DRT \sim \triangle SGP$. If the similarity ratio (or scale) is $\frac{3}{10}$, what is GP?

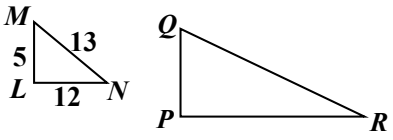


8. $\triangle ABC \sim \triangle WXY$. If the similarity ratio (or scale) is $\frac{6}{5}$, what is WY?



EXAMPLE

$\triangle LMN \sim \triangle PQR$. If the similarity ratio (or scale) is $\frac{2}{5}$, what is PR?



The fractions are:

SCALE	$\frac{LM}{PQ}$	$\frac{MN}{QR}$	$\frac{LN}{PR}$
$\frac{2}{5}$	$\frac{5}{PQ}$	$\frac{13}{QR}$	$\frac{12}{PR}$

Since I want PR, I'll use that fraction.

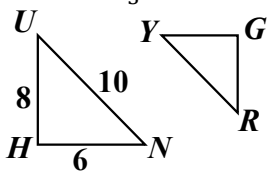
$$\frac{2}{5} = \frac{12}{PR}$$

$$2(PR) = 12(5)$$

$$2(PR) = 60$$

$$PR = \boxed{30}$$

9. $\triangle HUN \sim \triangle GRY$. If the similarity ratio (or scale) is $\frac{5}{3}$, what is RY?



10. $\triangle FOR \sim \triangle MED$. If the similarity ratio (or scale) is $\frac{7}{4}$, what is RY?